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EUROPEAN PATENT APPLICATION

⑲ Application number: 85201386.1

⑤① Int. Cl.⁴: C 12 G 3/04

⑳ Date of filing: 02.09.85

③① Priority: 04.09.84 NL 8402696

④③ Date of publication of application:
09.04.86 Bulletin 86/15

⑥④ Designated Contracting States:
BE DE FR GB IT NL

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⑥④ A method of preparing a stable alcoholic beverage, on the basis of soured milk, having good keeping characteristics.

⑥⑦ A method of preparing a stable alcoholic beverage on the basis of soured milk and having good keeping characteristics. Milk or milk enriched with fat, with a fat content of at least 4% is mixed and homogenized, then eventually heat treated, rehomogenized and pasteurized before being soured by fermentation in known manner or by addition of a solution of an edible acid at a temperature below 5°C to a desired pH value. The resulting product is mixed, if desired, with water or a water-containing liquid and optionally with sugars, fruit juice, fruit concentrate, fruit essence, flavouring agents, colouring agents and/or thickening agents. The mixture is then homogenized in two stages, one at a pressure of between 180 and 250 bar and one at a pressure of between 10 and 80 bar. The mixture is subjected to a thermal treatment in which it is warmed-up to a temperature of between 45° and 55°C, while keeping the mass in motion and maintaining a temperature difference between the mass and a heating medium of no more than 10°C, and then cooled to a temperature of between 25° and 35°C, at which temperature the mixture is re-homogenized. The mass is then subjected to a thermal treatment to thermize, pasteurize or sterilize the product.

Carefully deaerated alcohol is added to the stable soured product, while the mass is kept in rapid motion, optionally in

combination with, or followed by the addition of flavour components. The pH of the liquid is adjusted to the value desired for the end product.

Eventually the product is pasteurized or sterilized.

Title:

A method of preparing a stable alcoholic beverage, on the basis of soured milk, having good keeping characteristics.

This invention relates to a method of preparing stable alcoholic beverages on the basis of soured milk products having good keeping characteristics.

Many types of soured milk are known, differing in appearance, taste and flavour, depending on the way the milk is treated, the way of acidulation or fermentation, the presence or absence of flavour and acid producing organisms or the addition of flavouring substances like the admixture of fruit juice, fruit concentrate or fruit juice essence. The stability of protein and fat in an alcohol beverage on the basis of soured milk can present problems if the beverage is prepared by mixing alcohol to usual fermented milks. Special difficulties can occur if the drinks are carbonated to make them effervescent.

Difficulties increase if the fat content of the milk is raised.

It is an object of the present invention to provide stable alcoholic beverages having a pleasant taste and having good keeping characteristics on the basis of a fat-containing soured milk product, which may or may not be mixed with fruit juice, fruit concentrate, or fruit essence.

According to the present invention, there is provided a method of preparing stable alcoholic beverages on the basis of soured milk and having good keeping characteristics, which comprises

- a) making a soured milk or milkproduct enriched with fat, having a fat content of at least 1%;
- b) mixing the resulting product, if desired, with water or a watercontaining liquid, and optionally with sugars, fruit juice, fruit concentrate, fruit essence, flavouring agents, colouring agents and/or thickening and stabilizing agents;
- c) homogenizing the mixture in two stages at a pressure of between 180 and 250 bar and at a pressure of between 10 and 80 bar, respectively;
- d) subjecting the mixture to a thermal treatment in which it is warmed-up to a temperature of between 45° and 55°C, while keeping the mass in motion and maintaining a temperature difference between the mass and a heating medium of no more than 10°C;
- e) cooling the mixture to a temperature of between 25C and 35°C;
- f) re-homogenizing the mixture at said temperature of between 25° and 35°C;
- g) subjecting the mass to a thermal treatment to thermize, pasteurize or sterilize the product;
- h) adding carefully deaerated alcohol to the stable fermented product while keeping the mass in rapid motion, optionally in combination with, or followed by, the addition of flavour components; and
- i) adjusting the pH of the liquid to the value desired for the end product.

The soured milk or milk-products can be made by conventional methods, by inoculating the milk with cultures of desired microorganisms and incubation at a suitable tempe-

rature. Cultures of living organisms can however present problems, they can become infected with phages, the proportions between different types of bacteria can change and other factors influence the production of flavour and the consistency and the resistance to alteration during processing.

So it can be advantageous to make the soured milk by adding a solution of an edible acid to milk or milk enriched with fat at a temperature below 5°C. Preferentially the temperature should not exceed 2°C. For acidulation citric acid, malic acid, fumaric acid, gluconic acid, glucono-delta-lactone, lactic acid in pure form, in mixtures or as a concentrated fermentation fluid can be used. Specific flavours can be accentuated by addition of natural or nature-identical flavours.

In the method according to the invention, we preferably use milk having a fat content of 1-10%.

The method according to the invention is particularly satisfactory if the mixing ratios are selected so as to produce a beverage having a fat content of between 1 and 12% by weight and an alcohol content of between 0.5 and 19% by weight.

The method according to the invention is productive of a beverage suiting the requirements made extremely well, if the pH is adjusted to a value of between 3.5 and 5.0.

According to the invention it is possible to obtain beverages with a stable flavour and taste. In the case of low alcohol contents microbiological alterations might be feared. To prevent this the product can be finally subjected to a thermal treatment to thermize, pasteurize or sterilize it

before, during or after bottling.

The invention is illustrated in and by the following examples.

Example 1.

5 736 kg whole milk, having a fat content of 3.5%, was
adjusted to a fat content of 10.5% by means of 264 kg cream
containing 35% fat. This mixture was homogenized at a pressure
of 200 bar, pasteurized for 180 seconds at 98°C, and cooled
to 30°C. At this temperature, the mixture was inoculated
10 with 0.25 kg IST culture (a standard culture of Streptococcus
thermophilus and Lactobacillus bulgaricus, supplied by NIZO
at Ede, The Netherlands), and fermented until a pH value of
4.2 was reached.

Subsequently, the mixture was cooled to 15°C and mixed
15 with 70 kg saccharose, 10 kg glucose and 264.5 kg water in
which were dissolved 2 kg citruspectine and 3.5 kg orange
essence.

When the ingredients were thoroughly mixed, the mixture
was homogenized in two stages at pressures of 220 bar and
20 bar, whereafter the temperature of the mass was increased,
while causing the mass of flow, to 52°C, maintaining a tem-
perature difference between product and heating medium of 8°C.
Immediately after reaching this temperature, the mixture was,
still flowing, cooled to a temperature of 32°C, maintaining
25 a temperature difference between product and cooling medium
of 8°C. The product was subsequently subjected to a heat
treatment at 90°C for 60 seconds and cooled to 15°C. At this
temperature it was mixed with 150 kg previously carefully

deaerated alcohol with an alcohol content of 80% by weight, whereafter the pH of the beverage was adjusted with food grade citric acid to 4.1.

5 The yoghurt liqueur thus produced had a fresh taste, a fat content of 7.0% and alcohol content of 8.0%, and after storage for 6 months at a temperature of 20°C had fully retained its original structure and taste.

Example 2.

10 The preparation of the beverage as described in Example 1 was repeated, but after the addition of the alcohol and adjusting the pH value to 4.1, carbon dioxide gas was introduced into the beverage under pressure. Thereafter the beverage was bottled, and bottles were sealed gas-tight.

15 The result was an extremely sparkling beverage which, after storage at 20°C for six months did not show any deterioration in quality.

Example 3.

20 The procedure of Example 1 was followed, but the milk was mixed with 350 kg aqueous solution containing 80 kg saccharose, 10 kg glucose and 1.5 kg pectine. When the liquid had subsequently been subjected to the thermal and homogenization treatments and cooled to 15°C, it was mixed with a mixture of 150 kg deaerated alcohol with an alcohol content of 80% by weight and 12.5 kg concentrated maracuja nectar, 25 whereafter the pH was adjusted to 4.3. Thereafter carbon dioxide was introduced into the beverage at a pressure of 1.2 bar, and the beverage was packed in a gas-tight manner.

The ready beverage contained 6.9% fat and 7.9% alcohol. After storage at room temperature for 6 months, no deterioration was found as regards either structure or organoleptic properties.

Example 4.

5 385 kg skim milk of 0.1% fat and 615 kg cream having a fat content of 30.0% were mixed to produce a fat content of 18.5% . Subsequently the milk was mixed with 50 kg saccharose and 10 kg glucose, homogenized at a pressure of 200 bar and pasteurized at 98°C for 180 seconds.

10 After cooling to 30°C the milk was subjected to fermentation with 0.5 kg starter comprising equal quantities of Streptococcus lactis and Streptococcus cremoris. The fermentation was terminated as soon as a pH value of 5.0 was reached.

 Subsequently, 263.5 kg water, 1.5 kg pectine and 100 kg
15 cherry juice were added. After being subjected to the homogenization and thermal treatments as described in Example 1, the mixture was cooled to 15°C and mixed with 353.5 kg
50% well-deaerated alcohol. After adjusting the pH to 4.5,
introducing carbon dioxide gas at a pressure of 2.2 bar. The
20 beverage was packed in a gas-tight manner. The ready beverage contained 10.4% fat and 9.9% alcohol.

Example 5.

 752 kg sweet butter milk with a fat content of 0.4% was mixed with 247 kg cream with a fat content of 30%. The re-
25 sulting mixture had a fat content of 7.7% and was treated in accordance with Example 3, except that, after fermentation. homogenization, thermal treatments and cooling to 15°C, it was

mixed with 150 kg well deaerated 80% alcohol and 40 kg passion-fruit concentrate, whereafter the pH was adjusted to 4.5. The resulting beverage was also treated with carbon dioxide and was packed in bottles in a gas-tight manner. The beverage had a fat content of 5.0% and an alcohol content of 8.8%.

Example 6.

785 kg milk with a fat content of 3.8% was carefully mixed with 215 kg cream having a fat content of 30%. Thus enriched, the milk had a fat content of 9.4%.

This cream was subjected to a two-stage homogenization at 250 and 50 bar, subsequently, flowing in a plate-type heat exchanger, using a temperature difference of 8°C, warmed-up to 73°C and immediately thereafter rehomogenized at 180 and 35 bar, pasteurized for 3 minutes at 9.8°C and cooled to 2°C. At this temperature the mixture was soured by addition of a 25% solution of lactic until a pH-value of 4.1 was reached.

Subsequently, the mixture was mixed with 70 kg saccharose, 10 kg glucose and 264.5 kg water in which were dissolved 7 kg citruspectine. The soured cream was subjected to a two-stage homogenization at 250 and 50 bar, subsequently, flowing in a plate-type heat exchanger, using a temperature difference of 8°C, warmed up to 52°C and immediately thereafter cooled in a heat exchanger to 32°C, using a temperature difference of 8°C, at which the mixture was rehomogenized at the said pressures. The product was subsequently subjected to a heat treatment at 90°C for 60 seconds and cooled to 15°C. At this

temperature it was mixed with a deaerated mixture of 60 kg
50% alcohol, 40 kg pass-on fruit concentrate, 170 kg saccha-
rose and 378.5 kg water. After adjustment to pH 3.8 carbon
dioxide was introduced in the conventional manner. The product
5 containing 4.7% fat and 1.5% alcohol was bottled and
pasteurized for 15 minutes at 65°C.

After storage for 2 months it was found to have fully
retained its original taste character and appearance and its
original physical structure.

10 Example 7.

The procedure of Example 6 was followed, but instead of
a mixture of 70 kg saccharose, 10 kg glucose and 264.5 kg
water, a concentrated hydrolyzed wheysirup was used. The
beverage had virtually the same sweetness as that described
15 in Example 5; its fat content was 4.7% and its alcohol content
1.5%. Here again, after storage at 25°C for 2 months, no
change was to be noted.

Example 8.

The procedure of Example 6 was followed, but instead
20 of 70 kg saccharose and 10 kg glucose, 80 kg mannitol was
incorporated as a sugar substitute. The cream was soured to
pH 5.0. Furthermore a CMC-derivate was used instead of
pectine as the stabilizer. The result was analogous to that
of Examples 6 and 7.

Example 9.

868 kg milk with a fat content of 3.5% was mixed with 132 kg cream containing 30% fat. This mixture had a fat content of 7.0%.

5 After the souring and stabilizing process of example 6, a mixture of 500 kg fortified wine, 120 kg saccharose and 91.5 kg orange flavour concentrate was added.

10 This product containing 3.5% fat and 12% alcohol after 3 month storage in the dark, did not show any deterioration in taste and physical structure.

Example 10.

15 The procedure of example 9 was followed but instead of lactic acid, a mixture of citric acid and malic acid was used for souring the cream. After storage of 3 months in the dark the product did not show any deterioration in taste and physical structure.

C L A I M S
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1. A method of preparing a stable alcoholic beverage on the basis of soured milk products and having good keeping characteristics, which comprises
 - a) making a soured milk or milkproduct enriched with fat,
5 having a fat content of at least 4%;
 - b) mixing the resulting product, as desired, with water or a water-containing liquid, and optionally with sugars, fruit juice, fruit concentrate, fruit essence, flavouring agents, colouring agents and/or thickening and stabilizing agents;
 - 10 c) homogenizing the mixture in two stages at a pressure of between 180 and 250 bar and at a pressure of between 10 and 80 bar, respectively;
 - d) subjecting the mixture to a thermal treatment in which it is warmed-up to a temperature of between 45° and 55°C,
15 while keeping the mass in motion and maintaining a temperature difference between the mass and a heating medium of no more than 10°C;
 - e) cooling the mixture to a temperature of between 25° and 35°C;
 - 20 f) re-homogenizing the mixture at said temperature of between 25° and 35°C;
 - g) subjecting the mass to a thermal treatment to thermize, pasteurize or sterilize the product;
 - h) adding caerfully deaerated alcohol to the stable fermented product while keeping the mass in rapid motion,
25 optionally in combination with, or followed by, the addition of flavour components; and

1) adjusting the pH of the liquid to the value desired for the end product.

2. A method according to claim 1, wherein the soured milk or milkproduct enriched with fat in step a) is made by a

5 process comprising

k) mixing milk with skim milk or cream to a desired fat content;

10 l) homogenizing the mixture in two stages at a pressure of between 180 and 250 bar and at a pressure of between 10 and 80 bar respectively;

m) subjecting the mixture to a thermal treatment in which it is warmed up to a temperature of between 45°C and 55°C, while keeping the mass in motion and maintaining a temperature difference between the mass and a heating medium
15 of no more than 10°C;

n) cooling the mixture to a temperature of between 25°C and 35°C;

o) re-homogenizing the mixture at said temperature of between 25°C and 35°C;

20 p) subjecting the mass to a thermal treatment to thermize, pasteurize or sterilize the product;

q) souring the mixture by fermentation or by addition of acid.

3. A method according to claim 1, wherein the soured milk or milkproduct in step a) is made by fermenting milk or milk
25 enriched with fat by inoculation with a suitable culture or mixture of cultures of micro-organisms and incubation at a suitable temperature.

4. A method according to claim 1, wherein the soured milk or milkproduct in step a) is made by adding a solution of an edible acid to milk or milkproduct enriched with fat at a temperature below 5°C.

5 5. A method according to claim 3, wherein the temperature at the addition is below 2°C.

6. A method according to claim 3, wherein the edible acid is chosen from the group of lactic acid, citric acid, malic acid, fumaric acid, gluconic acid, glucono-delta-lactone in
10 pure form, as a mixture or as a concentrated fermentation fluid.

7. A method according to claim 1, which comprises carbonating the beverage.

8. A method according to claim 1, wherein the starting
15 product in step a) is milk, or milk enriched with fat, having a fat content of between 1 and 20%.

9. A method according to claim 1, wherein the ratio between milk, alcohol and other ingredients is so selected as to produce a beverage having a fat content of between 1 and 12%
20 by weight and an alcohol content of between 0.5 and 19% by weight.

10. A method according to claim 1, wherein the pH of the product is ultimately adjusted to a value of between 3.5 and 5.0.

25 11. A method according to claim 1, wherein the product is finally subjected a thermal treatment to thermize, pasteurize or sterilize it before, during or after bottling.



European Patent
Office

EUROPEAN SEARCH REPORT

0177077

Application number

EP 85 20 1386

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl. 4)
A	FR-A-2 360 666 (E. SORG) * Claims *	1	C 12 G 3/04
A	--- JOURNAL OF THE SOCIETY OF DAIRY TECHNOLOGY, vol. 35, no. 2, April 1982, pages 41-43; W. BANKS et al.: "Formulation of cream-based liqueurs: a comparison of sucrose and sorbitol as the carbohydrate component" * Table I *	1	
A	--- EP-A-0 067 592 (NABISCO BRANDS INC.) * Claims *	1	
			TECHNICAL FIELDS SEARCHED (Int. Cl. 4)
			C 12 G
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 10-10-1985	Examiner COUCKE A.O.M.
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	